CALCULATOR GAMES

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Two Calculator Trick

This is an amazing trick in which you can actually write down the answer before you start. As its name implies, this stunt requires two calculators, one for you and one for a willing victim.

To start the action, you write any number between 1 and 25 on a piece of paper. Screw up the paper before handing it over to your victim to put in his pocket. Then ask your victim to switch on his calculator and enter any number between 25 and 100 without letting you see. While he is busy thinking of a number, you use your own calculator to subtract (−) the number that you wrote on the piece of paper from 99. When you obtain the answer, just ask your victim to add (+) your result to the number on his machine.

Now comes the tricky bit. Provide your victim with a sheet of paper and ask him to write down (without letting you see) the number in his calculator. Then ask him to cross out the first digit and add (+) it to the result. This is a very simple sum, and your friend will have no difficulty in working it out in his head or on the sheet of paper.

Finally, ask your victim to use his calculator again to subtract (−) the answer on the sheet of paper from his original number. After a few seconds, ask him to look at the screwed-up piece of paper in his pocket. He will be very surprised to find that it agrees exactly with the figures in his calculator.

1. You write 22 on a piece of paper. Screw it up and give to victim.
2. Victim (without letting you see) enters 57 into his calculator.
3. You use your calculator to subtract 22 from 99 and obtain 77.

```
99 [−]
22 [=]
--
77
```

4. Ask victim to add 77 to the figure in his calculator (you cannot see).

```
57 [+]
77 [=]
---
134
```

5. Tell him to write down his answer, cross out the first digit and add it to his result.

```
134
  1
---
 35
```

6. Now suggest that he uses his calculator to subtract the figure on paper from the number he first thought of.

```
57 [−]
35 [=]
--
22
```

7. He can now look at the piece of paper in his pocket and will be astounded to reveal that it, also, is 22.

Example 1

The two-calculator trick will also work for larger numbers. Example 2 shows what happens when you write down any number between 1 and 100 and your victim chooses from numbers between 100 and 1000. The only difference from the first method is in step 3, where you subtract from 999 instead of 99.

1. You write 63 on a piece of paper. Screw it up and give to victim.
2. Victim (without letting you see) enters 312 into his calculator.
3. You use your calculator to subtract 63 from 999 and obtain 936.

```
999 [−]
 63 [=]
---
936
```

4. Ask victim to add 936 to the figure in his calculator (you cannot see).

```
312 [+]
936 [=]
----
1248
```

5. Tell him to write down his answer, cross out the first digit and add it to his result.

```
1248
   1
----
 249
```

6. Now suggest that he uses his calculator to subtract the figure on paper from the number he first thought of.

```
312 [−]
249 [=]
---
 63
```

7. When he looks at the piece of paper in his pocket it will reveal, as you would expect, the number 63.

Example 2: Larger numbers

7–11–13 Trilogy

The '7–11–13 Trilogy' is a neat little trick which is best performed when there are several people present.

It works like this: when you have collected a small audience and are ready to begin, pass the calculator to a friend and ask him to enter three digits, 459 for example, and then pass the calculator to someone else.

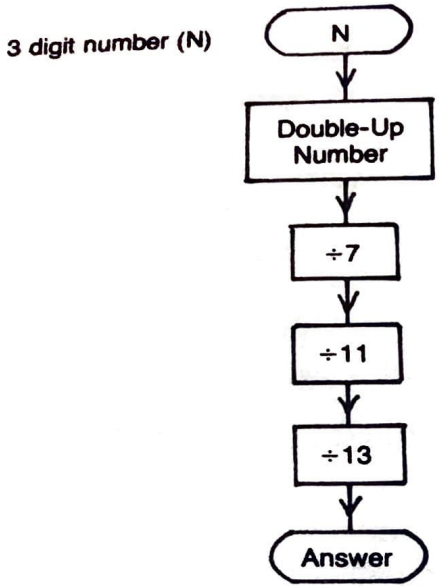
The second person is asked to repeat the three digits and then give the calculator to another friend. (In our example, the calculator display would now read 459459).

Pretend to think deeply for a few moments; ask the person holding the calculator to divide (÷) by 7 and pass the machine on. After another short period of concentration, ask for the number in the display to be divided (÷) by 11.

Now it is your turn. Take back the calculator, and after studying it for a few seconds, divide (÷) by 13.

The number shown on the display is the same as the one orginally entered, and you can proceed to announce the result, to the astonishment of your friends.

It is easier to see what is happening if you study the flow picture (a). The trick is worked through for the sample number 459 in (b).



(a)

Enter three digit number	459	
Double-up	459459	÷
÷7	7	=
	65637	÷
÷11	11	=
Take back calculator	5967	÷
÷13	13	=
Answer	459	

(b)

Can you think how this trick works? Well, the secret lies in the fact that:

$$7 \times 11 \times 13 = 1001$$

(Check it on your own calculator)

Now, if you multiply (×) any three-digit number by 1001, it 'doubles up'. For example:

$$459 \times 1001 = 459459$$

Our clever mathemagician simply relies on the reverse of that fact.

———— o ————

99-Up

'99-Up' is a calculator race game in which the first player to reach the total score of 99 is the winner.

Number of players 2

Materials Pocket calculator

Play

The two players toss a coin to decide who will start. Whoever wins the toss first checks that the calculator is clear (empty) and then adds any number between 1 and 10. After pressing the add (+) key, the calculator is passed to the second player. It is now the second person's turn to enter a number between 1 and 10 before pressing the add (+) key and handing back the calculator. This process continues, with the score gradually mounting up, until a total of 99 is reached. The player holding the calculator when his happens is the winner.

Suppose David and Sarah decide to play a game. David wins the toss and enters the number 7. After pressing the plus (+) key, he passes the calculator to Sarah, who adds 5, to make a total of 12. The rest of the race is shown in (a).

David		Sarah		Score
7	+			7
		5	+	12
8	+			20
		10	+	30
10	+			40
		8	+	48
9	+			57
		6	+	63
10	+			73
		8	+	81
7	+			88
		2	+	90
9	+			99

(a) David wins

David		Sarah		Score
7	+			7
		4	+	11
8	+			19
		3	+	22
10	+			32
		1	+	33
9	+			42
		2	+	44
10	+			54
		1	+	55
7	+			62
		4	+	66
9	+			75
		2	+	77
5	+			82
		6	+	88
3	+			91
		8	+	99

(b) Sarah wins

As you can see, David is the winner.

Soon after this, Sara met Professor Knowall and told him about her game with David. The Professor stroked his beard thoughtfully. 'You should have won that game, you know,' he told Sarah, and then whispered the secret to her. The next day, Sarah again met David, and challenged him to another game. As before, David won the toss and started with a 7. This time, however, Sarah replied by entering a 4. As you can see from example (b), Sarah goes on to win the return match.

Can you spot the trick that Professor Knowall taught Sarah?

It works like this. The first person to reach a score of 88 can be sure of winning. This is because his opponent must add some number between 1 and 10, and all our player on 88 has to do is to top it up to 99. The argument can be continued so that the first player to reach 77, 66, 55, 44, 33, 22 and 11 can be sure of winning. You can see that this is just what Sarah did – she always made sure that after her turn, the total was a multiple of 11. Since David went first, she could not lose.

After a while, of course, your opponent may rumble the trick. It might be good idea, therefore, to play '101-Up' in which the first person to reach a total of 101 wins.

Here, Professor Knowall's magic numbers are not so obvious. However, they do exist, and the player who can reach the numbers 2, 13, 24, 35, 46, 57, 68, 79 and 90 first can be sure of winning. In (c), you can see how Sarah won the toss and beat her Dad at '101-Up'.

Sarah		Sarah's Dad		Score
2	+			2
		8	+	10
3	+			13
		7	+	20
4	+			24
		3	+	27
8	+			35
		10	+	45
1	+			46
		5	+	51
6	+			57
		4	+	61
7	+			68
		10	+	78
1	+			79
		6	+	85
5	+			90
		4	+	94
7	+			101

(c) Sarah wins again

You may have noticed that in '99-Up' the second player can always be sure of winning. In '101-Up', the first player can always be sure of winning.

Why not make up a few calculator race games for yourself? Any target score can be chosen, and it is not necessary to use only the numbers 1 to 10 for addition.

Zero Racer

This is a calculator race game with a difference – it goes backwards instead of forwards. To be strictly accurate, the game invoves subtracting numbers rather than adding them up. The first player to score zero, wins.

Number of players 2

Materials Pocket calculator

Play

After making sure that the calculator is clear, one of the players enters the number 19 and then presses the minus (–) key. A coin is then flipped to see who starts. The player who wins the toss enters either a 1 or a 2, presses the equal (=) key and then, after also pressing the minus (–) key, hands the calculator to his opponent.

The players take it in turn to subtract (–) either a 1 or a 2 until a score of 0 is registered on the calculator. Whoever is holding the calculator when the zero appears is the winner. Suppose our old friends David and Sarah arrange a game. Sarah wins the toss, enters a 2 and reduces the total to 17. On his first go, David chooses a 1 and lowers the total score to 16. The process continues as shown in (a) until Sarah wins.

David		Sarah		Total	
Start				19	–
		2	=	17	–
1	=			16	–
		2	=	14	–
1	=			13	–
		2	=	11	–
2	=			9	–
		1	=	8	–
2	=			6	–
		2	=	4	–
2	=			2	–
		2	=	0	

(a) Sarah wins

David		Sarah		Total	
Start				19	–
		2	=	17	–
2	=			15	–
		2	=	13	–
1	=			12	–
		2	=	10	–
1	=			9	–
		1	=	8	–
2	=			6	–
		2	=	4	–
1	=			3	–
		2	=	1	–
1	=			0	

(b) David wins

This time, it is David who meets Professor Knowall and benefits from his advice. In the return match, Sarah again wins the toss, but David manages to end up the winner.

By looking at (b), can you spot Professor Knowall's trick?

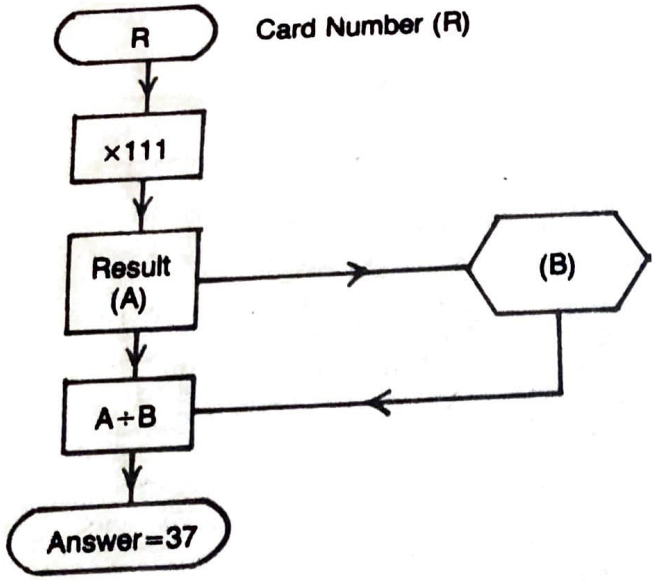
It is simple, really. Professor Knowall explains it as follows. The first player to reach 3 is sure of winning since his opponent must subtract a 1 or a 2, thus leaving the way clear for a score of zero to be reached on the next turn. Similarly, the first player to reach 6, 9, 12, 15 and 18 can be sure of winning. After a while, the trick may become obvious. However, it is fairly simple to change the start number, and to alter the numbers that may be subtracted.

Triple Trick

There is always something a little bit special about magic that involves playing cards. For this short trick, you will need an ordinary pack of cards with the tens, jacks, queens and kings removed. If you cannot put your hand on the real thing, just write one of the numbers 1,2,3,4,5,6,7,8,9 on each of nine pieces of paper.

To start this trick, ask a friend to pick a card or piece of paper at random. Make a show of not looking at his card – you can sit on the other side of the room, or be blindfolded if you like. After making sure that he has a calculator, tell your friend to multiply (×) the number he picked by 111. Next, suggest that he leaves the result in the calculator while he adds the individual digits together in his head. Finally, ask for the number in the calculator to be divided (÷) by the sum of its digits. Pretend to concentrate for several seconds before suggesting that the calculator will be showing the number 37. It will, and everyone will be astonished by your mental powers.

The method is shown in the flow picture.



Just to prove that the trick always works, suppose your friend Jack picked a card displaying the number 7. Then

Jack's number	7	×
Multiply by	111	=
	777	+
Divide by (7+7+7=21)	21	=
Answer	37	

Seven – The Number of Creation

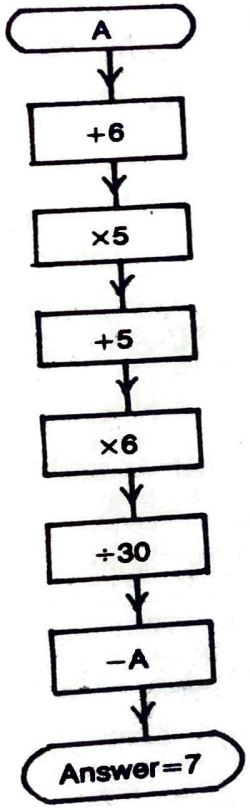
Long ago, the mystics and fortune-tellers believed that numbers had magical powers. Seven was a particularly important number and became known as 'The Number of Creation'. If you think really hard, you may be surprised at just how often the number 7 turns up. There are seven days in a week, seven ages of man, seven seas, seven wonders of the world, and so on.

The idea of this trick is that whatever secret number your friend puts into the calculator, you can use your special powers to ensure that he will always end up with seven (7) – the number of creation.

As with all matters mathemagic, the trick will be greatly improved by some good showmanship on your part. Do be sure to look wise and tell your victim about the special power of the number 7.

To work the trick, ask your friend to enter any number of less than seven digits into the calculator. It is best if he also writes down the number on a piece of paper – it will be needed later. You can then give him a sequence of instructions which will ensure that his calculator ends up displaying the mystical number 7.

The set of instructions is shown in the flow picture.



Number (A)

After one or two practice attempts, you will find the sequence of steps easy to remember. Once your friend has entered his number into the calculator, you ask him to add (+) 6 and multiply (×) the result by 5. You then suggest that he continues the trick by adding (+) 5 and multiplying (×) by 6. Finally, you instruct your friend to divide (÷) whatever is in the calculator by 30 and then subtract (−) the number he first thought of. Sure enough, the calculator ends up by displaying 7 – the number of creation.

The following calculations give an example of how this trick may be worked.

Enter number	317	+
Add 6	6	=
	323	×
Multiply by 5	5	=
	1615	+
Add 5	5	=
	1620	=
Multiply by 6	6	=
	9720	÷
Divide by 30	30	=
	324	−
Subtract first number	317	=
	7	

Number Reflections

This stunt is not really a trick to be worked on a particular victim. However, when the conversation lags, it can be very useful for entertaining a small audience. All you will need is a calculator (of course), pen, paper and, most important, your best showbiz manner. To work 'Number Reflections', you must try to act as an absent-minded, mad professor.

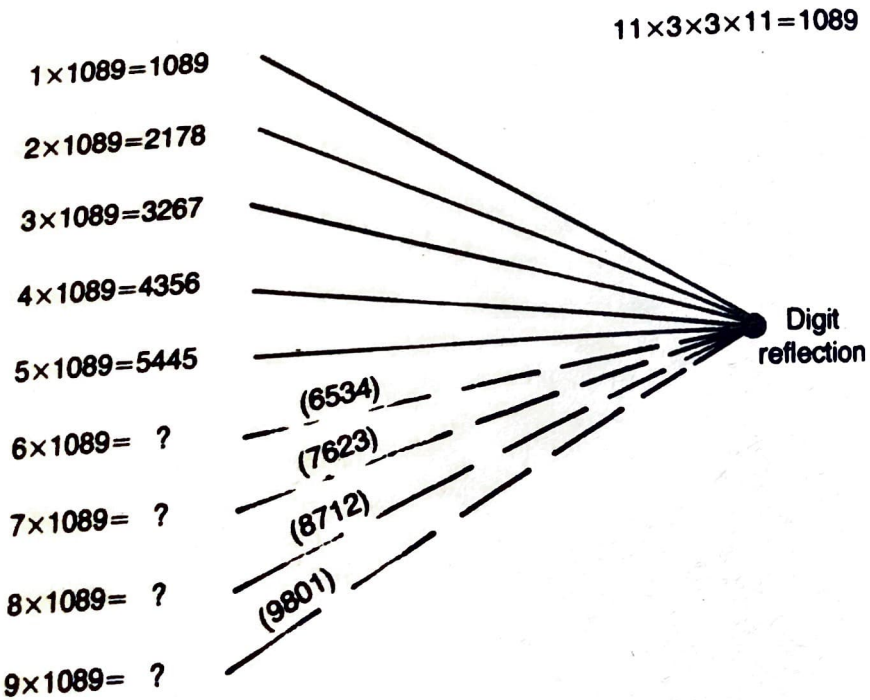
Begin by writing down a few random sums and using your calculator to get the answers. This haphazard number doodling should get the attention of your audience and the proper jugglery of figures can begin.

The first step is to arrive at the number 1089 by absent-mindedly working out the product $11\times3\times3\times11$. When the number (1089) appears on the calculator register, you go into your mad professor routine and shout, 'At last! I've found it – the magic reflective number.' This outburst is bound to result in someone asking you what you mean. You can then, with the help of your calculator, write down the first five terms in the 1089 times table. Be sure to stop at the fifth term and draw in your digit reflector as shown.

All that remains is for you to explain how the number reflector, which simply reverses the digits, will enable you to complete the 1089 times table without any more calculations on your part.

Do make sure that a member of the audience uses a pocket calculator to check the results.

Just to vary your part, you could always fill in the last five entries in the 1089 times table and then use the number reflector to derive the first four terms.



Number reflections

Hats, Coats and Shoes

'Hats, Coats and Shoes' is short and rather neat. It is similar to the dice trick, but appeals particularly to people who are clothes-conscious. This trick is best when played with young people because some grown-ups have so many clothes that the large number will mess up your calculations.

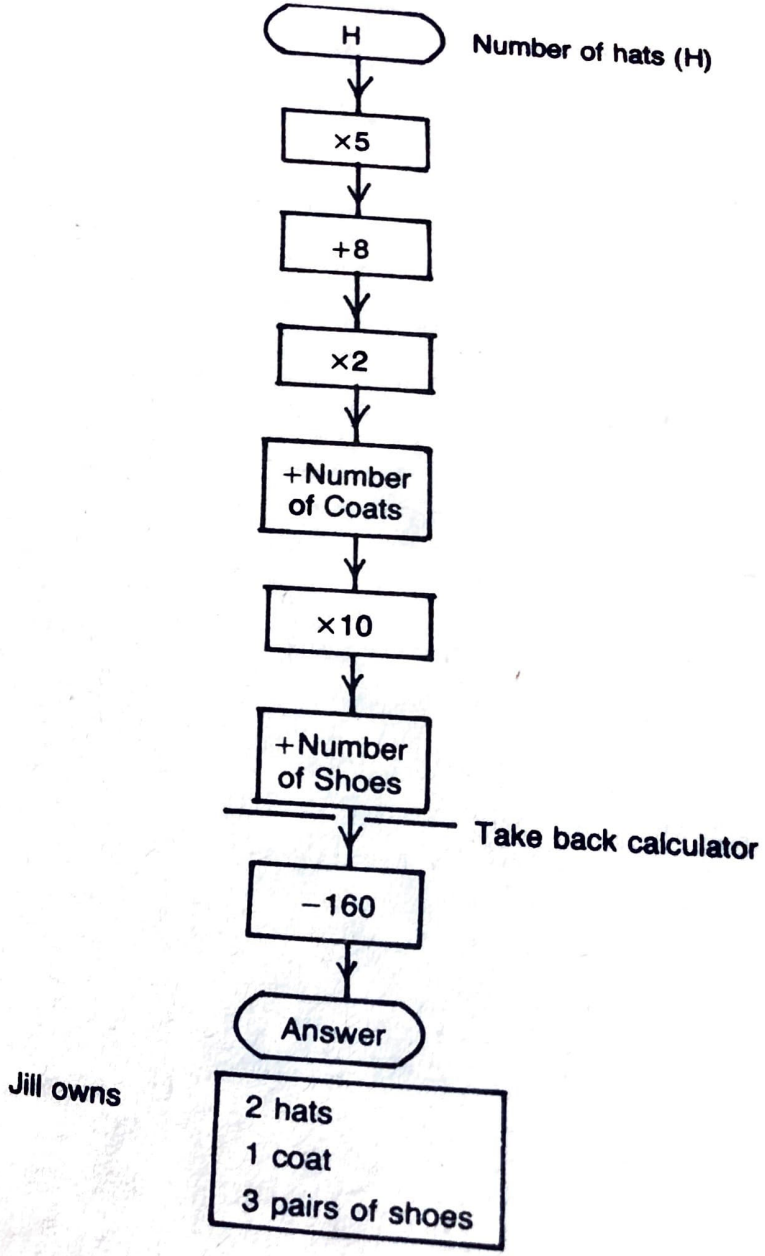
Suppose Jill volunteers to be your victim. You hand her the calculator and then ask her to turn round so that you cannot see what numbers she is putting into the machine. Begin your patter by suggesting that, as Jill always seems to be wearing something different, she

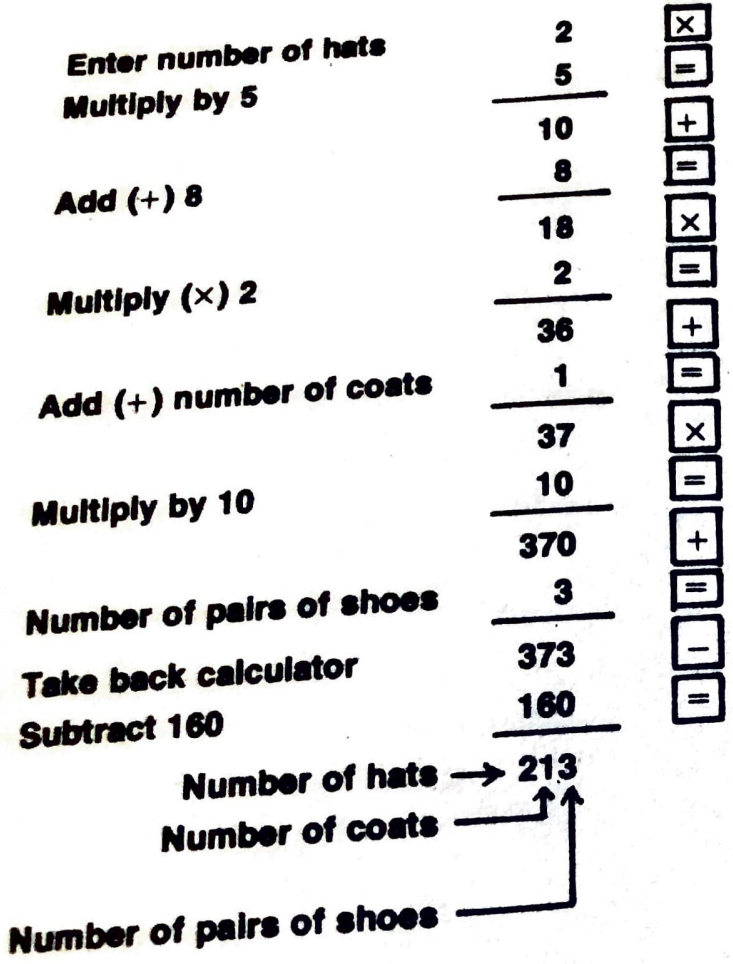
must have a lot of clothes. The chances are that Jill will protest that she has not, and this will let you in to suggest the 'Hats, Coats and Shoes' trick.

As usual, the easiest way of seeing the instructions that you should give Jill is to look at the flow picture.

In words, you begin by asking Jill to count up how many hats she owns and enter her number into the calculator. Suggest next that she multiplies (×) this by 5 and then adds (+) 8. When she has multiplied (×) the results by 2, ask her to add in the number of coats that she possesses, and carry out a final multiplication (×) by 10 before adding in (+) the number of pairs of shoes in her wardrobe. You can now take back the calculator. After a quick subtraction (−) of 160 from Jill's total, you can tell how many hats, coats and shoes she owns. The digit on the left gives the number of hats, the middle figure the number of coats, and the right-hand digit tells you the number of pairs of shoes that Jill has.

Do you agree with the example in which Jill has 2 hats, 1 coat and 3 pairs of shoes?





Jill's hats, coats and shoes

Think of a Number

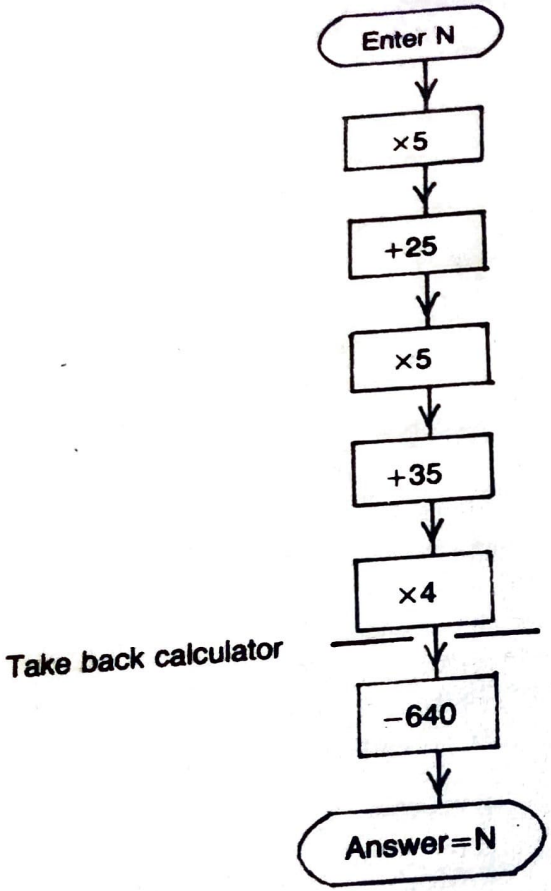
This is another magic trick in which you can use your telemaths power to discover the unknown value of an opponent's number; what is more, you can even make him do most of the work.

As with all such mathemagical projects, things tend to work better if you choose a time in the late evening to work the trick. Then, the drawn curtains and dimmed lights all add to the 'atmosphere'.

Begin by selecting a friend who looks as though he might be good at operating a calculator. Allow yourself to be blindfolded, and then ask your victim to put any number (not more than five digits) into the display.

The next step is to give a series of instructions which, while they appear completely haphazard, will always take you back to the first unknown number.

The rules of 'Think of a Number' are most easily explained in the flow picture.



In words, once your friend has entered his unknown number, ask him to multiply (×) by 5, add (+) 25, multiply (×) again by 5 and then add (+) 35 to the result before carrying out a final multiplication (×) by 4. Now remove your blindfold and ask for the calculator. By subtracting (−) a further 640 and crossing out the last two digits, you will arrive back at your friend's original number.

The example shows how the trick works when the victim's number is 25679.

It is a good tip, when starting this or any other trick, to write the steps in ink on the palm of your hand. Then, if you forget, a quick peek at your hand when nobody is looking will save the day. This should still be possible if you are blindfolded – provided the blindfold is not too tight and you can squint downwards.

N=25679

Enter number (N)	25679	
Multiple (×) by 5	5	× =
	128395	
Add 25	25	+ =
	128420	
Multiply by 5	5	× =
	642100	
Add 35	35	+ =
	642135	
Multiply by 4	4	× =
	2568540	
Subtract 640	640	− =
	2567900	

Try not to work this, or any one trick too many times at the same party, otherwise your friends may begin to notice the underlying patterns.

Telephone Number Trick

This is a good trick to play when you are still sitting round the table after a big meal.

Select a victim who is sitting on the opposite side of the table and ask him to scribble his telephone number down on a napkin, without letting you see what he writes. Ask him to be sure to leave out the area dialling code or this will make the number too big. (Most calculators can only manage numbers containing up to eight digits.)

After making some show of not knowing your victim's telephone number, and not being able to see what he writes, tell him to mix up the digits in a haphazard fashion so that he ends up with a new number.

Now, ask your friend to look at both this new number and his original telephone number and subtract (−) the smaller from the larger. You will, of course, happen to have a handy calculator in your pocket, just for the purpose.

When your victim has completed his subtraction, ask him to cross out any one of the digits (except 0) in the answer, and then tell you what the remaining digits add up to.

After a little bit of acting in which you could pretend to be having difficulty in seeing the answer because of the 'bad vibrations', you can astound everyone by telling your friend the value of the digit that he crossed out.

It works like this: whenever you take a number of two or more digits, mix up the digits to form a new number, and subtract (−) the smaller from the larger. It is one of the mathematical laws of nature that the sum of the digits in your answer will be a multiple of 9.

For example:

2 digit number
Mix up digits to form new number

65
56
---
9 (multiple of 9)

Subtract

3 digit number
Mix up digits to form new number

651
156

495

Add digits in answer: 4+9+5=18 (multiple of 9)

4 digit number
Mix up digits to form new number

6452
5246

1206

Add digits: 1+2+0+6=9 (multiple of 9)
and so on.
Be sure to convince yourself by putting in your own numbers.

Now, the telephone trick uses the fact that, after the subtraction, the sum of the digits will always be a multiple of 9. If our victim tells us the sum of the digits in the answer after one has been crossed out, all we need to do to find the missing digit is to subtract the answer he gives us from the next highest multiple of 9.

The following examples will make things clear.

Case I

373-8804
Mix up digits — 3738804
Take the smallest from largest — 7883340
— 7883340
Friend crosses out 5 — 3738804
Sum of digits — 4144536
=4+1+4+4+3+6
Next highest multiple of 9 =22
Therefore, value of missing digit =27
=27−22= 5

Amazing, isn't it? Just to be on the safe side, let's try another number.

Case II

Friend's telephone number
(459-3611)
Mix up the digits — 4593611
Take the smallest from the largest — 1619354
— 4593611
Friend crosses out second of the 2s — 1619354
Sum of digits — 2974257
=2+9+7+4+5+7
Next highest multiple of 9 =34
Therefore, value of missing digit =36(4×9)
=36−34=2

Runs

This is a simple, yet fascinating calculator race game. Any number of people can play.

Each person is given a figure, which he attempts to reduce to 1. The player who reaches the target (1) in the least number of steps (shortest run) wins the round.

Number of players 2 or more

Materials Calculator
Pack of playing cards
Pencil and paper

Remove all the tens, jacks, queens, kings and jokers from the pack. You should then have thirty-six cards (an ace counts as 1).

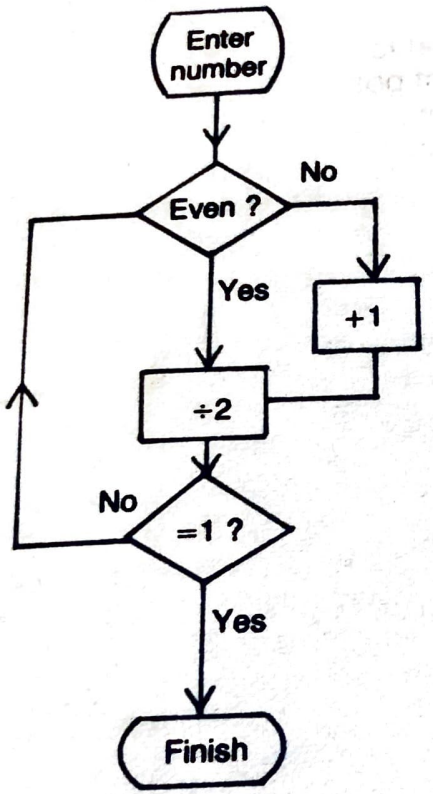
Play

The pack is cut to see who deals. High cards win.

After giving the cards a good shuffle, the dealer passes three cards to each player. (In the unusual case of a game consisting of more than twelve people, a second pack of cards will be needed).

Once a player receives his cards, he can arrange them in any order he wishes, to make up a three-digit number. The cards 1, 3, 6, for example, could be arranged to make 136, 631, 361, 163, 316 or 613. Later, you will see that the choice of order can be important.

When everyone has decided how to arrange his three cards, the hands are turned over. The dealer goes first and puts his number into the calculator. He also writes it down on a piece of paper. Now, to change his starting number, there are two simple rules to follow. If it is even, he can divide (÷) by 2, but if it is odd, he must add (+) 1. This will give a new result in the calculator, which is also written down. The dealer now repeats the process again and again, as shown in the flow picture, until he ends up with a 1 in the calculator display.



All of the numbers on the piece of paper are then counted (including the 1) to find the run length.

The example shows how it is done for the numbers 136 and 613, and hence, why the order in which a player arranges his cards is important.

When the dealer has completed his turn, he passes the calculator to the player on his right who goes through the same procedure. After five rounds, each player counts the length of his or her run, and the person with the lowest total is declared the winner.

The smallest possible run length is 8. Anyone who is desperately unlucky, however, may clock up a run length of 18.

When you have practised a few games of 'Runs', the pencil and paper can be thrown away – you will find it easy enough to work out run lengths in your head.

	613	O
+1	614	E
÷2	307	O
+1	308	E
÷2	154	E
÷2	77	O
+1	78	E
÷2	39	O
+1	40	E
÷2	20	E
÷2	10	E
÷2	5	O
+1	6	E
÷2	3	O
+1	4	E
÷2	2	E
÷2	1	O
17 length of run		

	136	E
÷2	68	E
÷2	34	E
÷2	17	O
+1	18	E
÷2	9	O
+1	10	E
÷2	5	O
+1	6	E
÷2	3	O
+1	4	E
÷2	2	E
÷2	1	O
13 length of run		

O = odd E = even

Example of making runs

The Bones Race

Number of players 2 or more

Materials 2 dice and shaker
Calculator for each player

Play

Each player rolls the two dice, and the one with the highest total starts.

Play proper starts when the first person enters 100 into his calculator and then rolls the two dice. Depending on the total dice score, he will then 'operate' on the number in his calculator according to the instructions in the action chart.

Dice	Action	Score
	Start	100
(4)	+25	125
(9)	+25	150
(3)	÷2	75
(8)	+25	100
(7)	×3	300
(7)	×3	900
(12)	÷2	450
(6)	+25	475

Helen's practice

Why don't you have a practice game of 'The Bones Race' and see how long it takes to reach 1000?

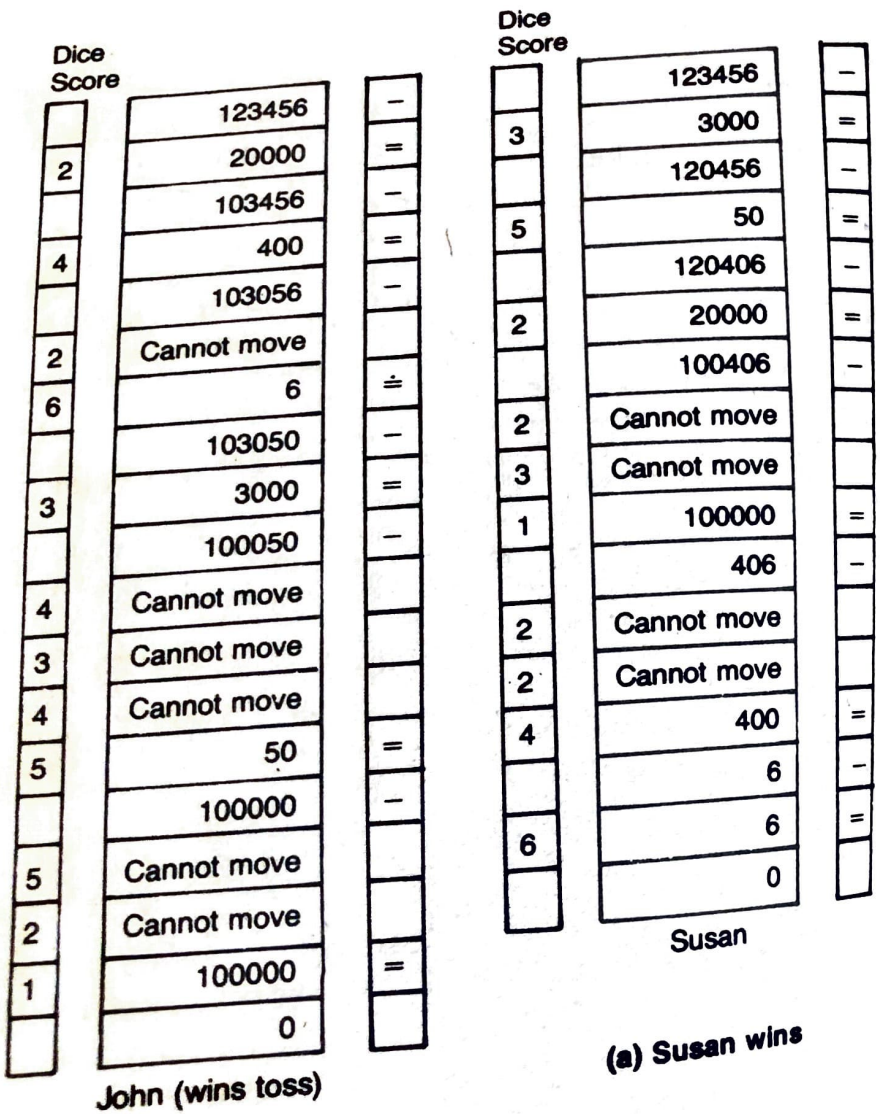
Disappearing Digit

Number of players 2 or more

Materials 1 dice and shaker
Pocket calculator for each player

Play

Before starting the game proper, everyone enters the numbers 123456 into his calculator, and then presses the minus (−) key. Players then take it in turns to roll the dice in order to decide who shall begin. The one with the highest score starts and play proceeds in a clockwise direction. The first player to 'empty' his calculator is the winner.



(a) Susan wins

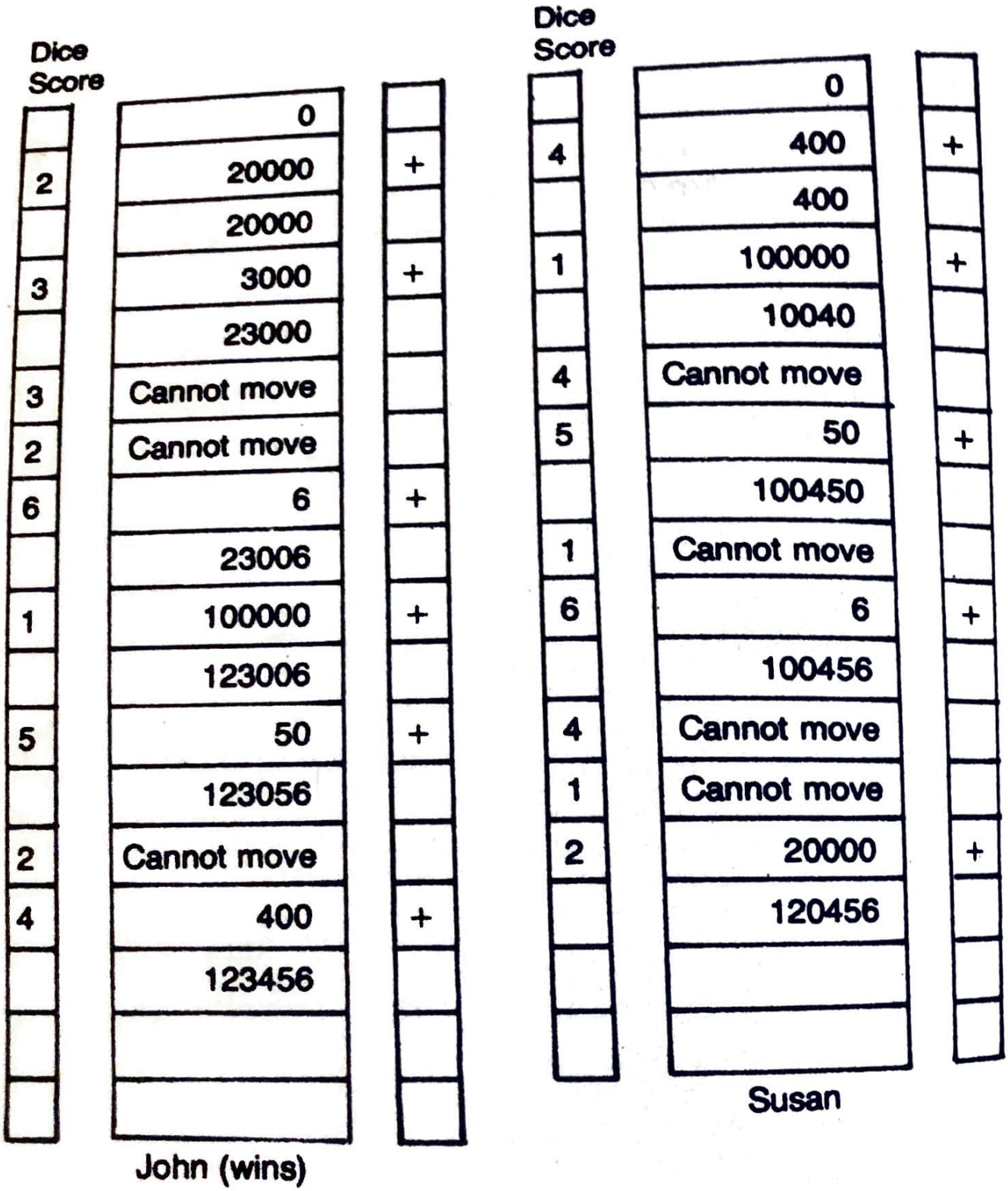
In our trial game (a) John throws a 5 and Susan a 3, so John has first go. He begins the game proper by rolling a 2. Now, the object of the game is to 'empty' the calculator by getting rid of the numbers 1, 2, 3, 4, 5 and 6 as they turn up on the dice. This can be achieved by subtraction (−). However, just taking away a 2 will not help John very much. To get rid of the 2 in his calculator, he needs to subtract the number 20,000. He does this by entering 20,000 and pressing the equal (=) key. The calculator then shows 103456. John ends his turn by pressing the minus (−) key again.

Susan's first go results in a score of 3. She subtracts 3,000 and is left with 120456.

John and Susan continue to throw the dice in turn until Susan manages to empty her calculator first, and wins (a).

Early on in the game it is fairly easy to get rid of numbers, but the pace slows down towards the end. Waiting for that last digit can be very frustrating. On average, you can expect 'Disappearing Digit' to last for about fourteen throws per player.

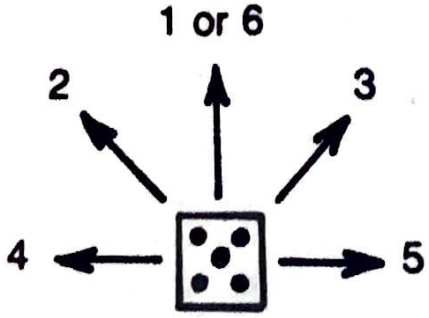
A longer version of the game can be played in which not only must the calculator be emptied, but the dice thrown again and again until it is refilled with the numbers 123456. In our trial game of the Reverse Race (b), John is the first to refill his calculator and is declared the winner.

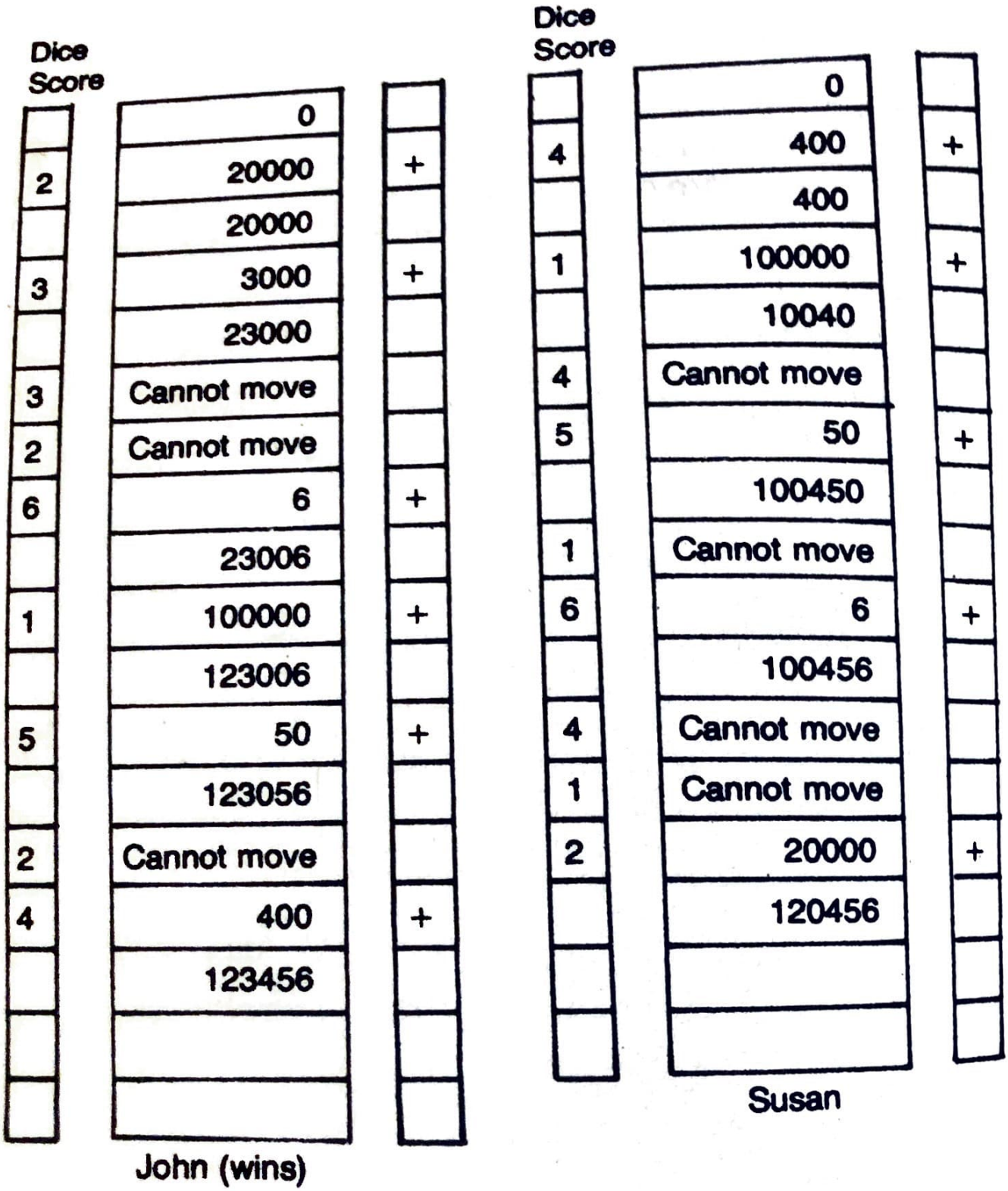


(b) Reverse Race

Lunar Race

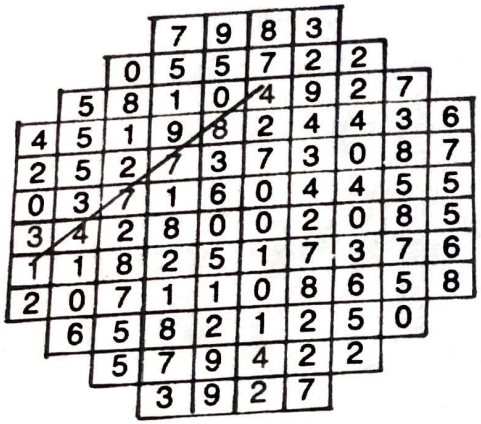
'Lunar Race' is a simple but fascinating game which uses dice as well as a calculator. We suppose the existence of some future space city in which the ten dormitory modules are connected by a network of spaceways, as shown in the diagram. The player who manages to accumulate the highest score on his way from the start to the finish is the winner.





(b) Reverse Race

Hidden Numbers

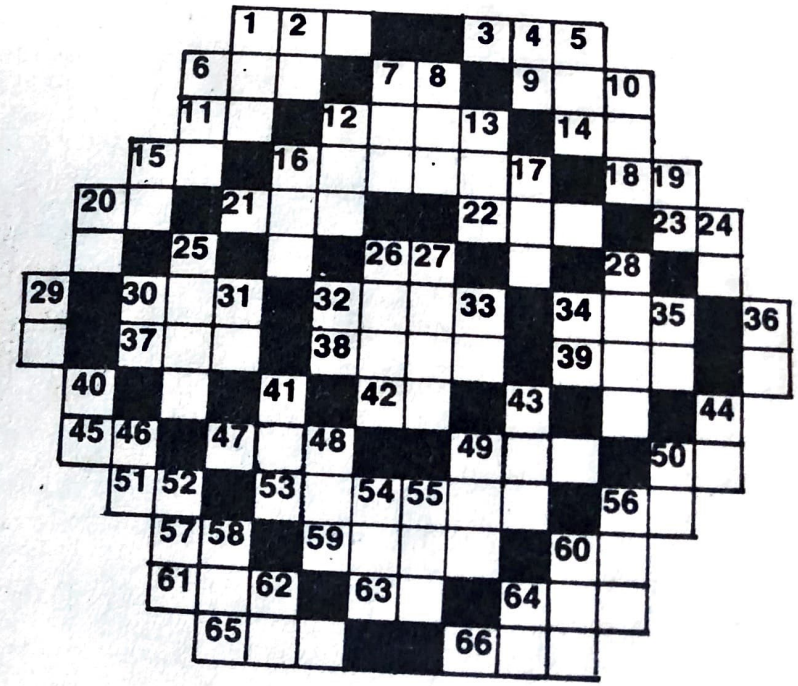


Here is a hidden number grid. It contains the answers to the following twenty sums. Can you find the hidden numbers? To get you started, the first answer has been marked.

1. 232×637
2. 1001×67
3. 12×13×14
4. 1×2×3×4×5×6×7
5. 124÷0.125
6. 12345×0.6
7. 287÷0.2
8. 34,786+21,429+48,712
9. (179+63)×449
10. (77+122)÷.04
11. 217.2×980
12. 214÷0.05
13. (2156−698)×0.5
14. 7×8×9×10×11
15. (121+87)×(256+73)
16. (63+11)×(29+12)×(43+32)
17. (135+29)×(197−48)
18. (1×2×3×4×5×6×7×8×9)÷ (1×2×3×4×5)
19. (5×5×5)×(9×9)
20. 25÷0.02

Sum 1. 232×637=147784 marked on grid.

Giant Cross Number Puzzle



Can you use your calculator to fill in the empty spaces

Number of players 2 or more

Materials Calculator for each player
Dice and shaker
Small coins to be used as counters

Play

To decide who shall begin the game, each player takes it in turns to roll the dice. The one with the highest score starts, and play proceeds in a clockwise direction.

Play proper starts with the first player on module 1. He enters 100 into his calculator and rolls the dice, but can move only in those directions shown by the arrows.

If he is lucky enough to move, he multiplies (×) the amount in his calculator by the number of the module to which he has moved. If he cannot move, he must multiply (×) the total in his machine by 0.5.

Positions can be marked with small coins, but players must be careful not to mix up their counters.

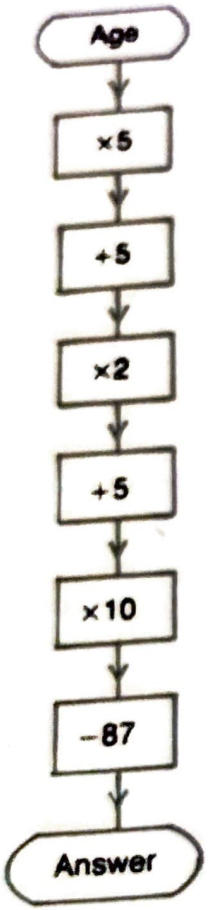
When all the players have completed their journey from the start to the finish, the player with the highest score in his calculator is the winner.

From the example you can see that Elizabeth takes eight goes to complete the course with a score of 2100 points. This is a little better than average, but it is possible to score 216,000 points.

Dice Score	Move	Action	
1	Start – module 6	100 × 6 = 600	Total
2	Cannot move	600 × 0.5 = 300	
6	Module 6 – module 7	300 × 7 = 2100	
2	Cannot move	2100 = 0.5 = 1050	
6	Cannot move	1050 × 0.5 = 525	
6	Cannot move	525 × 0.5 = 262.5	
5	Module 7 – module 8	262.5 × 8 = 2100	
1	Module 8 – finish	2100	

Elizabeth scores 2100

Elizabeth's practice for Lunar Race



(a)

In words, the friend is asked to multiply (×) his age by 5, add (+) 5, multiply (×) again by 2, add (+) yet another 5, and then carry out the final multiplication (×) by 10, before subtracting (−) 87 from the total. Our mathemagician can then remove the blindfold and ask to see the calculator.

After making some show of studying with care the numbers in the calculator, he reads out the first two digits and amazes everybody by correctly stating his friend's age.

To see if the trick works, Tom, who is fourteen years old, tries it out on himself. You can see from (b) that he ends up with the number 1463, so that the first two digits, 14, give his age correctly. Later, Tom uses his magical powers to discover that his Dad is forty-three years old.

	Tom's Age		Tom's Dad's Age
Age	14	×	43
×5	5	=	5
	70	+	215
+5	5	=	5
	75	×	220
×2	2	=	2
	150	+	440
+5	5	=	5
	155	×	445
×10	10	=	10
	1550	−	4450
−87	87	=	87
Answer	1463		4363

(b) Age calculator

in the giant number crossword? The clues are given below.

Across

1. $3\times3\times5\times5$
3. $6\times6\times6$
6. $12012\div77$
7. 256×0.125
9. $9196\div19$
11. $(6\times18)-12$
12. 143×7
14. $1040\div20$
15. 0.25×192
16. 983×851
18. $2475\div55$
20. $144\div6$
21. $9\times9\times9$
22. 8×66
23. 216×0.25
26. $2187\div81$
30. $131+197$
32. $2999+1683$
34. $17\div0.125$
37. 31×31
38. 28×307
39. 13×73
42. $7\div0.125$
45. $46.2\div0.7$
47. 11×54
49. 22×22
50. 55×0.8
51. $8832\div96$
53. 975×256
56. $198\div6$
57. $7938\div98$
59. $11130-9762$
60. $3267\div99$
61. $227\div0.25$
63. $7\div0.25$
64. 23×34
65. 7×137
66. 560×0.4

Down

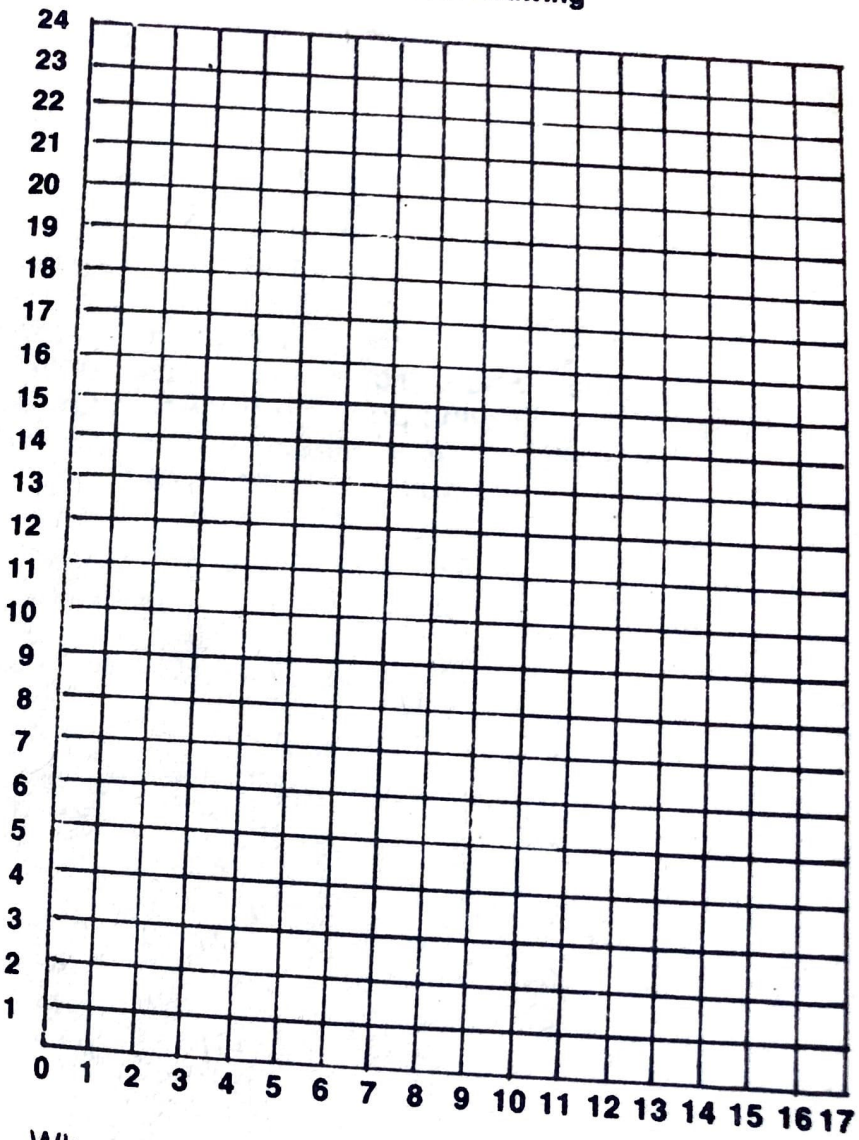
1. $4\times4\times4\times4$
2. $(3\times3\times3)-1$
4. 112×0.125
5. $(25\times27)+10$
6. $10{,}494\div53$
7. 17×18
8. $41\div0.2$
10. 8×53
12. $(12\times12)-5$
13. 540×0.25
15. $22\div0.5$
16. $165\div0.2$
17. 16×20.25
19. $605\div11$
20. $4116\div196$
24. $(92\times0.5)-5$
25. $3841+1428$
26. 45×59
27. 24×329
28. 153×48
29. $(15\times12)\div18$
30. $3\times(3+10)$
31. $6561\div81$
32. $528\div11$
33. 520×0.05
34. $1406\div74$
35. $40641\div589$
36. $(45\times99)\div55$
40. $26.4\div0.4$
41. $8996\div13$
43. $45\div0.25$
44. 17.6×2.5
46. $(15+8)\times3$
48. 21×21
49. $51\div0.125$
50. 17.2×2.5
52. 17×17
54. 4660×0.2
55. 1670×0.4
56. $83\div0.25$
58. $(987-6)\div9$
60. 24×16
62. $17\div0.2$
64. 192×0.375

Number Drawing

Here is another puzzle in which your calculator can help you to draw a number picture. Just work out the co-ordinates of the following points and mark them on your grid. When the points are joined together, you will be surprised to see what your calculator has drawn.

Point	Horizontal distance	Vertical distance
A	40×0.125	80×0.025
B	318−(6×52)	(63×89)−5605
C	10.2÷1.7	47.6÷11.9
D	5×1.4	138.6÷23.1
E	729÷81	21.6÷3.6
F	9÷0.9	(57×417)−23765
G	17÷1.7	199.8÷99.9
H	(11×19)−198	2792−(45×62)
I	1331÷121	216÷36
J	5156−(83×62)	1024÷128
K	(30×40)÷(6×20)	955.4÷56.2
L	18.4÷2.3	5×4.2
M	(19×78)−1476	4913÷289
N	4101−(63×65)	200×0.04
O	1280÷256	329−(17×19)
P	3946÷789.2	500×0.004

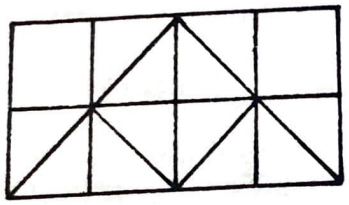
Number Drawing



Why not try making up your own number pictures? It is great fun. And it is easy enough to construct your own grids with a pencil and ruler.

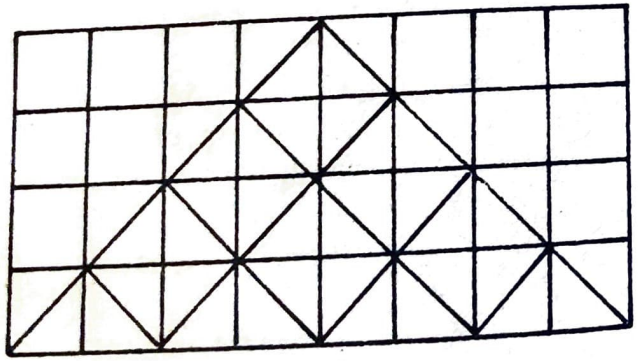
Martin's Puzzle

Here is an interesting geometric puzzle. Just count the number of squares and the number of triangles in the first picture (a) and multiply (×) the two together. Simple? All right, try to do the same thing for the second picture (b). Be careful, however, it is not as easy as it looks. The answer is quite large.



(Number of squares)×(number of triangles)=

(a)



(Number of squares)×(number of triangles)=

(b)

Sum Detective

Are you good at solving mysteries? If so, you will enjoy using your powers of detection to find the missing digits.

Each of the twenty sums below has at least one number missing. Can you use your pocket calculator to help you find the missing numbers? To help you get started, here is an example.

76×5?=440?

We have to find two unknown digits, represented by question marks. Starting with the left-hand side of the sum, we can try a few different values for the unknown number, and see what happens.

Try 1	76×51=3876	Too small
Try 9	76×59=4484	Too big, but only just
Try 8	76×58=4408	Correct!

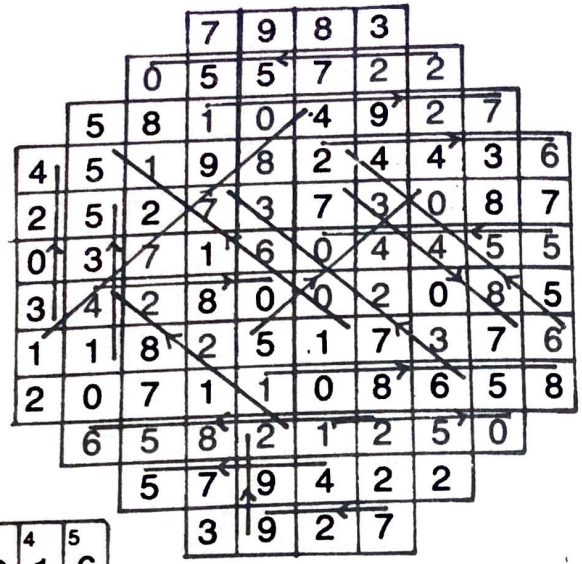
The value of both our missing numbers is 8. Nothing else will work.

Now you can try your luck on the other mystery sums.

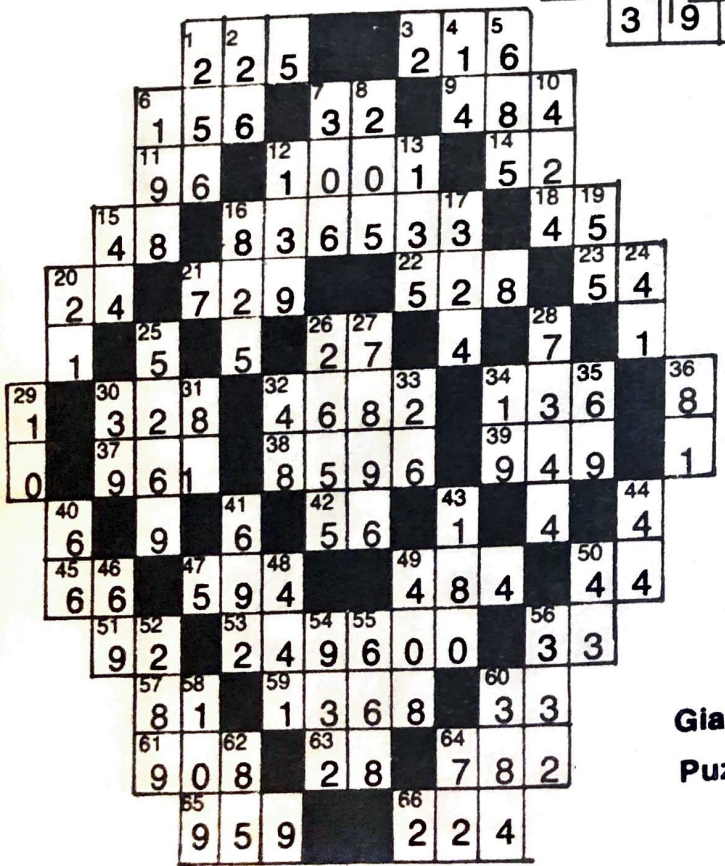
1. 459+2?5=724
2. 2?×21=?67
3. 78?−2?5=554
4. 924−69?=??6
5. 3×3×3×3×3×?=72?
6. 6?5×7=45?5
7. 512×??=1075?
8. 9?×58=??72
9. 124×6?=?556
10. 27×15?=4??6
11. 26×??×17=14144
12. 36?48÷56=658
13. 7×7×7×?=24?1
14. 10,485÷4=2?3
15. 11289+256?=1???6
16. 156?÷65=?4
17. 29?40÷45=6?2
18. 63×12×2?=21?24
19. (21+?)×(17+8)=67?
20. (42+?)÷(?+8)=4

Answers

Hidden Numbers



Giant Cross Number Puzzle



Martin's Puzzle

(a) Numbers of triangles =23
Number of squares =12
Triangles×squares =276

(b) Numbers of triangles =121
Number of squares =77
Triangles×squares =9317

Sum Detective

1. 459+265=724
2. 27×21=567
3. 789−235=554
4. 924−698=226
5. 3×3×3×3×3×3=729
6. 655×7=4585
7. 512×21=10752
8. 99×58=5742
9. 124×69=8556
10. 27×158=4266
11. 26×32×17=22464
12. 36848÷56=658
13. 7×7×7×7=2401
14. 10485÷45=233
15. 11289+2567=13856
16. 1560÷65=24
17. 29340÷45=652
18. 63×12×29=21924
19. (21+6)×(17+8)=675
20. (42+6)÷(4+8)=4
    or (42+2)÷(3+8)=4

Calculator Talk I

Did you know that your calculator could talk? No? Well, try this. Enter the number 0.1289 into your machine and then multiply (×) it by 6. Turn the calculator upside down and the answer will read 'hELLO'. Couldn't be more friendly! Do you want to learn your calculator's name? If so, just enter 28867 and multiply it by 11. When you turn the machine upside down it will say 'LESLIE'.

Of course, you may own a masculine machine, in which case it is best if you enter 227 and multiply by 34. This time, your calculator will give its name as 'BILL'.

See if you can use your calculator to find the word answers to the following questions.

(Always turn the machine upside down to read the answers).

1. Name of a famous oil company (5×15469)
2. Name of another famous oil company (1−0.447)
3. A sign of the Zodiac (0.19+0.18)
4. Turkeys do this (193402+185404)
5. Useful for squeaking hinges (14137−13427)
6. The good book (18×2101)
7. Musical instrument (40×77)
8. Garden implement (8×38)
9. For putting on the fire (958−351)
10. Not feeling well (3×257)

Calculator Talk II

Here is another puzzle where you will need to u
your calculator's ability to speak.

Ask it to supply the right words to complete the follo
ing sentences. (Again, do not forget to turn the mach
upside down in order to read the answer).

1. The farmyard was full of (8×4417)
2. The new potatoes were covered in (5×1421)
3. He did not have a (462+475) to stand on.
4. John was stung by a (13×26)
5. Make sure that you (4×1777) the water before m
   ing tea.
6. The Eskimo lived in an (1−0.9209)
7. He used the garden (16×219) to put out the f
8. Jack and Jill went up the (14×551)
9. The (807×45) of Troy lasted many years.
10. Animals live in a (4÷200)

CALCULATOR GAMES

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